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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/666,897	09/17/2003	Peter B. Atanackovic	39230-0704	9081
25213	7590	06/28/2004	EXAMINER	
HELLER EHRMAN WHITE & MCAULIFFE LLP			JACKSON JR, JEROME	
275 MIDDLEFIELD ROAD			ART UNIT	
MENLO PARK, CA 94025-3506			PAPER NUMBER	
			2815	

DATE MAILED: 06/28/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/666,897

Applicant(s)

ATANACKOVIC ET AL.

Examiner

Jerome Jackson Jr.

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 April 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 66-69, 71-79, 105, 106, 108-110 and 112 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 105 and 106 is/are allowed.
- 6) ☒ Claim(s) 66-69, 71-79, 108-110 and 112 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

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The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 66,67,69,73-78,109,110 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shin et al APL 6/00 in view of Ouchi '814.

Shin discusses in the first paragraph silicon based integrated optoelectronics. Shin also teaches an erbium doped Si/SiO₂ superlattice which could be used for light emission or detection in these proposed silicon opto-electronic devices. Shin does not specifically disclose the exact integrated electronic device structures, however, it is fair to state that well known opto-electronic integrated devices would be obvious to integrate with the erbium doped silicon superlattice of Shin. Ouchi teaches integration of opto-electronic devices including superlattice structures, waveguides, filters, etc. See figures 10-23 and the corresponding text. Claim 66 is rejected because Shin teaches an erbium doped superlattice in figure 1 and Shin with Ouchi suggests integrating the superlattice with waveguides, filters, modulators, etc. in order to form an optoelectronic apparatus with no polarization dependency. There is also no particularly claimed "filter" structure in claim 66 which would clearly structurally distinguish over the teachings and suggestions of the prior art applied. Claim 67 is rejected as the applied art teaches and suggests waveguide integration. See figure 10 of Ouchi. Claim 69 is rejected because Ouchi suggests side plurality of superlattice structures in figure 23, for example. The layers of the superlattice have different refractive indices and the structures can be tuned. Claim

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73 is rejected as it describes a basic edge emitting laser structure with an erbium doped superlattice. As stated above, Shin teaches the erbium doped superlattice and it would have been obvious to have implemented a superlattice as Shin in a edge emitting laser design to integrate with other devices in an optoelectronic circuit as Ouchi. See also that Ouchi teaches edge emitting laser structure. Claim 74 is rejected as laser facets are normally cleaved or etched and Ouchi shows edge laser structure in figures 9 or 10 for example. Claim 75 is likewise rejected as this structure is normal and shown by Ouchi. Claim 76 is also rejected as Shin teaches a plurality of repeating units in figure 1 and the laser output is fundamentally determined by the device properties. Claim 77 is rejected as Ouchi teaches DBR structure. Claim 78 is rejected as integration of optical amps is well known and discussed by Ouchi in column 2 lines 1-18 and there is no particular amplifier structure claimed which would structurally distinguish the claims over the suggestions over the applied art. Claim 109 is rejected as Shin teaches a superlattice of silicon with rare earth dopant and the superlattice defines a plurality of quantum wells. Furthermore, Ouchi suggests the superlattice emitter of Shin integrated next to or "interleaved with other quantum well structures. See figures 20-23, for example. Claim 110 is rejected as Shin with Ouchi suggest a superlattice erbium doped laser (electrically pumped amplifier) structure.

Claims 68,71,72,108,112 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shin with Ouchi and further in view of Huang '951.

Huang teaches a superlattice silicon based transistor. From the suggestions of Shin with Ouchi it would have been obvious to have practiced a transistor as Huang

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with erbium doping to emit light or to be integrated with other light responsive optoelectronic devices with erbium doping and silicon based structure. Claims 68 and 108 are obvious structure. Claims 71 and 72 are rejected as Huang teaches similar structure where there is a hetero-bipolar transistor and there are electrodes contacted to the emitter, base and collector regions as is ordinary in the art. See column 4 lines 54-64. Claim 112 is likewise rejected as mini-band injectors are well known in the heterojunction bipolar art and Shin suggests rare earth doping for light emission or integration with optoelectronic devices. There is no particular miniband structure claimed which would structurally distinguish over the applied art.

Claim 79 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shin with Ouchi and Huang and further in view of Thornton '681.

Claim 79 recites VCSEL laser structure with the addition of erbium doping and a silicon based superlattice design. As stated above, Shin with Ouchi and Huang suggest optoelectronic integration of erbium doped silicon superlattice structure. From Thornton it would have been obvious to have practiced VCSEL design in optoelectronic circuitry for the advantage of vertical emission or to make arrays of emitters. Claim 79 is obvious structure.

Claims 105 and 106 are allowable over the art of record.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jerome Jackson Jr. whose telephone number is 571 272 1730. The examiner can normally be reached on t-th 9-5.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on 571 272 1664. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

jj


JEROME JACKSON
PRIMARY EXAMINER